

REMARKS

I. Claim Status

Claims 42-57 and 59-83 are pending in the application. By this Amendment, Applicants have amended Claim 42 to expressly recite that the claimed process does not utilize peracids or hydrogen peroxide to form the elastomeric polymer. No new matter has been added. Exemplary written description support for this claim amendment can be found in the specification and claims as-filed, such as page 2, lines 20-25 and the Examples.

Applicants acknowledge the Examiner's withdrawal of the rejection under 35 U.S.C. § 102(e) over U.S. Patent Application Publication No. 2003/0139537 to Scholz et al. ("Scholz") and the rejections under 35 U.S.C. § 103(a) over Scholz, Scholz in view of U.S. Patent No. 5,840,809 to Ohtsuka et al., Scholz in view of Zhang et al., "Preparation of Epoxidized Rubber-Using a Reactive Processing Technique. I. Synthesis and Characterization of Epoxidized Polybutadiene Rubber," J. Applied Polymer Science 81:2987-2992 (2001), Scholz in view of Corey et al., "Buffered Potassium Peroxymonosulfate-Acetone Epoxidation of α,β -Unsaturated Acids," J. Org. Chem. 51:1925-1926 (1986), Scholz in view of WO 01/83466 to Wurziger et al., and Adam et al., "Methyltrioxorhenium(VII)-Catalyzed Epoxidation of Alkenes with the Urea/Hydrogen Peroxide Adduct," Angew. Chem. Int. Ed. Engl. 35:533-535 (1996).

II. Rejections Under 35 U.S.C. § 103(a)

A. Stevens in view of Adam

The Office rejects claims 42, 45-49, 51, 53-56, 62-65, 69-70, and 81-83 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,543,472 to

Stevens et al. ("Stevens") in view of Adam et al., *Methyltrioxorhenium(VII)-Catalyzed Epoxidation of Alkenes with the Urea/Hydrogen Peroxide Adduct*, Angew. Chem. Int. Ed. Engl. 1996, 35, No.5, 533-535 ("Adam"). See Office Action at 3-6. Applicants respectfully disagree and traverse for the reasons presented below.

According to the M.P.E.P., in order to establish a *prima facie* case of obviousness, the record must "include findings of fact concerning the state of the art and the teachings of the references" The Manual of Patent Examining Procedure ("M.P.E.P.") § 2141(II) (8th ed. rev. 7 July 2008) (relying on KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727, 82 U.S.P.Q.2d (BNA) 1385 (2007), and confirming the legal framework established by Graham v. John Deere Co., 383 U.S. 1, 17, 148 U.S.P.Q. (BNA) 459, 467 (1966)). Moreover, "[o]nce the findings of fact are articulated, [the rejection statement] must provide an explanation to support an obviousness rejection under 35 U.S.C. [§] 103." *Id.* If it is found that the prior art references fail to disclose all of the subject matter recited in a claim, the rejection statement "must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art." § 2141(III).

First, Stevens' relies upon peracids and hydrogen peroxide in contravention of the claims.

In pages 1 and 2 of Applicants' specification, Applicants disclose the drawbacks in the prior art for the use of peracids and hydrogen peroxide when forming epoxidized polymers. Applicants have avoided such compounds by using hydrogen peroxide precursors, such as inorganic persalts, metal peroxides, and hydrogen peroxide adducts. By their amendment, Applicants have made explicit that which was already

implicit - the claimed process does not comprise the use of peracids and hydrogen peroxide. Applicants respectfully submit that the combination of Stevens and Adam fails to establish a *prima facie* case of obviousness with respect to the subject matter recited in amended independent claim 42.

The Examiner argues that “Stevens teaches epoxidation of diene containing polymers. . . by adding the polymer and a percarboxylic acid epoxidizing agent and hydrogen peroxide in an aqueous solution, followed by further addition of water. . .” Office Action at 3. In fact, Stevens discloses a process that requires the use of, *inter alia*, a peracid solution. See Stevens at Abstract & Col. 2, lines 6-40. As note in Example 1, the peracid solution may comprise hydrogen peroxide and water in addition to the peracid. See Stevens at Col. 7, lines 9-13. The Examiner notes that “Stevens does not teach the hydrogen peroxide precursor is selected from inorganic persalts, metal peroxides, and hydrogen peroxide adducts.” Office Action at 3 (emphasis added). The Examiner notes, however, that “Adam teaches the use of urea/hydrogen peroxide adduct to oxidize organic olefins. . . [and it] would have been obvious to one of ordinary skill in the art to use the urea adduct taught by Adam because the urea adduct suppresses secondary reactions such as cleavage and rearrangement reactions. . . .” *Id.* at 3-4.

It is unclear from the rejection whether the Examiner intends for one skilled in the art to add the urea adduct or replace a compound in Stevens’ process with a urea adduct. Nevertheless, the claims remain patentable over the combination. If the urea adduct of Adam is to be simply added to the process of Stevens, the resultant process continues to comprise the use a peracid and a hydrogen peroxide. Since the claims

preclude the use of these compounds, the claims would not be rendered obvious. If the Examiner is relying upon Adam's suggestion to replace a hydrogen peroxide with a urea adduct,¹ then the resultant process continues to rely on the use of a peracid. Since the claims preclude the use of this compound, the claims would again not be rendered obvious.

Second, Stevens' does not appear to teach "at least one elastomeric polymer containing **ethylenic** unsaturation," as required by the claims.

Rather, the invention of Stevens appears to be directed to polymers with only aromatic unsaturation, not ethylenic unsaturation. In the Summary of the Invention, Stevens relies upon polymers that have been partially hydrogenated by Group VIII catalysts to be used in the invention. Col. 2, lines 7-11. While these polymers may have initially contained both aromatic unsaturation and ethylenic unsaturation, following the disclosed hydrogenation process, they appear to only have aromatic unsaturation. Column 4 details this process, explaining that "the hydrogenation process will selectively hydrogenate the diene without hydrogenating alkenyl aromatic hydrocarbon to any degree. . . . Nickel is the preferred Group VIII metal because it is inexpensive and capable of high activity hydrogenation of the diene portion of a block copolymer without hydrogenating the polystyrene [aromatic] segments." Col. 4, lines 18-31. Since it is after hydrogenation that the Stevens' process begins, Stevens appears not to teach the epoxidation of "at least one elastomeric polymer containing **ethylenic** unsaturation," as

¹ It is unclear whether Adam is teaching the substitution of the adduct for hydrogen peroxide in all situations. Rather, it appears that Adam is limited to those situations where MTO is present as a catalyst.

required by the claims. Further, Adams does not appear to provide any motivation to modify this teaching.

For at least the above-outlined reasons, Applicants' amended independent claim 42 is patentably distinguishable from Stevens and Adam. Further, claims 45-49, 51, 53-56, 62-65, 69-70, and 81-83 depend from amended independent claim 42 and should be patentably distinguishable from Stevens and Adam for at least the same reasons as amended independent claim 42. Therefore, Applicants respectfully request withdrawal of the § 103(a) rejection of claims 42, 45-49, 51, 53-56, 62-65, 69-70, and 81-83 based on Stevens and Adam.

B. Stevens and Adam in view of Ohtsuka

The Office rejects claims 43, 44, 49-52, 57, and 71-80 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Stevens and Adam in view of U.S. Patent No. 5,840,809 to Ohtsuka et al. ("Ohtsuka"). See Office Action at 6-8. Applicants respectfully traverse this rejection for the following reasons.

Applicant submits that Ohtsuka does not correct the deficiencies of Stevens and Adam, as discussed above. Accordingly, this rejection is also improper and should be withdrawn.

C. Stevens and Adam in view of Corey

The Office rejects claim 59 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Stevens and Adam in view of Corey et al., "Buffered Potassium Peroxymonosulfate-Acetone Epoxidation of α,β -Unsaturated Acids," J. Org. Chem. 51:1925-1926 (1986) ("Corey"). See Office Action at 8-9. Applicants respectfully traverse this rejection for the following reasons.

Applicants submit that Corey does not correct the deficiencies of Stevens and Adam, as discussed above. Accordingly, this rejection is also improper and should be withdrawn.

D. Stevens and Adam in view of Wurziger

The Office rejects claim 60 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Stevens and Adam in view of WO 01/83466 to Wurziger et al. ("Wurziger"). See Office Action at 9-10. Applicants respectfully traverse this rejection for the following reasons.

Applicants submit that Wurziger does not correct the deficiencies of Stevens and Adam, as discussed above. Accordingly, this rejection is also improper and should be withdrawn.

E. Stevens and Adam in view of Zhang

The Examiner rejects claims 66-68 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Stevens and Adam in view of Zhang et al., "Preparation of Epoxidized Rubber-Using a Reactive Processing Technique. I. Synthesis and Characterization of Epoxidized Polybutadiene Rubber," J. Applied Polymer Science 81:2987-2992 (2001) ("Zhang"). See Office Action at 10-11. Applicants respectfully traverse this rejection for the following reasons.

Applicants submit that Zhang does not correct the deficiencies of Stevens and Adam, as discussed above. Accordingly, this rejection is also improper and should be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

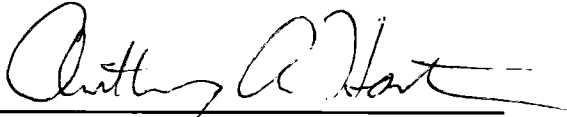
If the Examiner believes a telephone conference could be useful in resolving any outstanding issues, the Examiner is respectfully invited to contact Applicants' undersigned counsel at (202) 408-4275.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: July 10, 2009

By: 
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